

SECRET

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File A-101

28 February 1958

MEMORANDUM FOR: Project Director

ATTENTION : 25X1

SUBJECT : System IV (Serial 103)

1. As a result of further bench tests and two 7 hour flights of System IV (Serial 103) during the week of 17-22 February, the following faults were revealed:

<u>Box No.</u>	<u>Description</u>	<u>Fault</u>
1	Receivers 1A/1B	Noisy
2	Receiver II	Locked up for long periods on spurious signal. Sensitivity low.
3	Receiver III	Did not sweep
4	Receiver IV	Sensitivity low.
5	Receiver V	Sensitivity low.
6	Receiver VI	" "
7	Receiver VII	" ", Presselector sticks.
10A	Camera	Film stoppage
39	Receiver VIII	Spurious 700 cycle signals
39	Receivers IX, X	" " " "

2. On 23-24 February these faults were localized as follows:

<u>Box No.</u>	<u>Fault</u>
1	Noise due to external noise at test site. Receivers okay.
2	Spurious signal traced to Box II (Recorder), Receiver preamp not available at Base.
3	Broken roll pin on sweep slewing motor
4	Undetermined
5	Loose connection
6	Undetermined
7	Faulty presselector bearing. Reasons for lowered sensitivity undetermined.
10A	Undetermined
39	Spurious signal generated by chopper modulator in Box 39.

3. On the basis of paragraph 2, it was recommended to you on 24 February that System IV Serial 103 be held until these faults were corrected and a further flight test undertaken. The estimated time required for removing the majority of these faults was one week.

4. As of 26 February the following faults have been corrected:

<u>Box No.</u>	<u>Corrective Action</u>
1	No action required.
2	Spurious Signal found to be generated by capstan amplifier (Assembly 11-3) in Box 11. Damping resistors inserted. Receiver presamps available at Base B on the 101-102 Systems.
3	RelPin replaced
5	Connection repaired and receiver realigned
7	Tuning and preselector Head replaced.
39	Chopper removed.

In addition the AGC boards in all receivers have been changed to reduce the danger of repeated lock-ons on one signal.

5. The following faults have not been corrected:

<u>Box No.</u>	<u>Action Required</u>
4	Exact determination of reasons for reduced sensitivity.
6	" " " " " "
7	" " " " " "
10d	Exact determination of reasons for stoppage.

6. As things stand now, all major faults appear corrected except the film stoppage (Box 10d) and the reduced sensitivity of receivers IV, VI and VII. The film stoppage has so far not been serious -- from 3/4 to 7/8 of the film has been recovered - and may be cured by changing the method of loading the film. The receiver problem is best illustrated by the following table:

	Serial No. 101		Serial 102		Serial 103	
Receiver No.	Tangential Sensitivity (-dbm)	Pulse lockon Sensitivity (-dbm)	Tangential Sensitivity (-dbm)	Pulse lockon Sensitivity (-dbm)	Tangential Sensitivity (-dbm)	Pulse lockon Sensitivity (-dbm)
4	78-86	73-79	72-80	n.a.	82-87	69-75
6	79-86	72-79	78-82	n.a.	76-82	67-72
7	80-86	70-77	n.a.	n.a.	72-77	63-70

7. This table compares the three System IV models which have so far been built. Tangential Sensitivity is a measure of the absolute sensitivity of the receiver; Pulse lock-on sensitivity describes the

sensitivity in actual operational use, i.e., what strength of signal causes the receivers to stop sweeping, lockon and record the intercept. I have outlined the critical figures in red.

8. You will notice that for Receiver 4 the tangential sensitivity for Serial 103 is actually somewhat better than that of the other two models, although the pulse lockon sensitivity is down about 4 db. over that of Serial 101. (This reduces our range by a factor of about 1.6). Receiver 6 is down both in tangential sensitivity and pulse lockon sensitivity, the latter being 5-7 db. below that of 101. The tangential sensitivity of Receiver VII is also down considerably.

9. From this data it appears that the problem in Receiver 4 may be quite probably explained as incorrect adjustment and therefore correctable. Receivers 6 and 7 however, need to be investigated at length. R-W is checking on this today.

10. It then appears likely that, with the exception of Receivers VI and VII, System IV Serial 103 will be ready to go next week. Generally speaking it is greatly improved in reliability over Serials 101 and 102.

RECOMMENDATION: Subject to flight test System IV Serial 103 be shipped to Base B as soon as possible after 3 March. The Receiver II preamp at Base B should be used with Receiver II of Serial 103. If Receiver VI and VII cannot be brought up to snuff in this time, the best units from Serial 101 and 102 should be substituted for them.

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Acting ELINT Staff Officer

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